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ABSTRACT

Four full days of classroom instruction, devoted to the modeling of effective curriculum integration, were designed for preservice elementary school teachers. The unit was the result of a conviction on the part of teacher educators that children learn best when learning is not separated into forty-minute periods of math, social studies, language arts, and science, but rather combined into a more meaningful, holistic experience. To demonstrate to the education students the feasibility of this kind of teaching, the unit integrated all of the curricular areas into a "methods block." The unit was based on an episode of Carl Sagan's television series, "Cosmos." The episode selected was "The Harmony of Worlds," which tied together the whole fabric of crucial events within a particular historical period. The motivation for, planning, and execution of the unit are discussed and each day's activities are described. Factors which led to its success are considered. (JD)

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Cosmos: The Integrated Day Comes to College

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Abstract

A successful unit which integrated all of the curricular areas in a "methods block" is described. The motivation for and planning and execution of the unit are discussed, along with some factors which led to it's success. The unit was based on an episode of Carl Sagan's PBS series Cosmos.

Cosmos: The Integrated Day Comes to College

Elementary schools have long been criticized for their inability to provide for effective curriculum integration (Kohl, 1979; Fortson, 1977; Bealing, 1972; Marshall, 1968; Tucker, 1981; Russell and Dunlap, 1972). Critics claim that children learn best when learning is not separated into forty-minute periods of math, social studies, language arts, and science but rather combined into a more meaningful, more "holistic" experience. While this critique of elementary classrooms is generally valid, teachers have not been inactive in attempting to provide for more curriculum integration.

A recent review of literature identified nearly 100 examples of attempts at curriculum integration. Eight of these articles described attempts to integrate language arts into a part of the art curriculum and two dealt with attempts to integrate art into a part of the language arts curriculum. Of special interest was the dearth of literature that reported attempts at total integration. Only two articles (Aldrich, 1974; Yeoman, 1971) described classroom settings where the integration of content from all of the subject areas was a significant goal.

Also conspicuously absent from the sample of literature which we reviewed were examples from the field of Teacher Educa-

tion. Again, only two articles were found that dealt with the preparation of pre-service teachers. In one case, the instruction was limited to one day and the other case involved a study which attempted to improve pre-service teachers' ability to integrate language arts and science (Steinruck and Hungerford, 1978). A recent study of social studies teacher educators in a mid-western state also found that the integration of content was not a priority of teachers in that sample (Thompson, LaBine, Fair, 1982).

Our own experience with integration as teacher educators was probably not unlike that of most of our colleagues in the field. We endorsed the idea, challenged our students to provide more integration in their own classrooms and shared with students some of the earlier attempts at integration. We did not, however, provide specific instruction beyond a conventional, and admittedly brief, period of lecture-discussion.

We resisted making serious attempts at integration for a number of reasons. We were organized in a fairly conventional mode and it would be difficult to restructure the time and course content necessary to give attempts at integration a fair trial. We also felt that all of the material we included in our various courses was important and hated to give up any of our own content to contribute to a unit on integration. However, in January, 1981, we agreed that we would devote a significant amount of class time to the topic of integration and that we

would spend a considerable amount of time in preparing for the experience.

Carl Sagan's Public Television series, Cosmos, was the vehicle with which we launched our experiment with integration. Here was a series of programs that dealt not only with astronomy and other scientific areas, but also dealt with history, mathematics, geography, literature, human ambition and human frailty. Sagan, in his most memorable episodes, tied together the whole fabric of crucial events within a particular historical period. Here was a theme, ready made and attractively packaged. "The Harmony of Worlds," which described Johannes Kepler's discovery of the laws of planetary motion, the historical setting in which the discoveries were made, Kepler's transitional role from astrology to astronomy, and some history of the study of the heavens, was chosen as the basis for an integrated unit.

Objectives and goals for the unit on integration were agreed upon and activities planned to meet all of the general goals. Also, prior to the actual unit, we shared with the students some of our plans for the unit, and also talked to them about some of the advantages of integration.

Four full days of classroom instruction were devoted to the modeling of an integration strategy. In addition, students were expected to do a significant amount of reading and writing outside of class. Over 60 books, each with some relationship to the Cosmos theme, were gathered from the library and attractively

displayed in the classroom. Monday morning we were "off and running" or in this case, soaring through space among Carl Sagan's billions and billions of stars in the heavens via the magic of videotape and large screen television.

DAY 1 - 9:00 a.m. - 12:00 p.m.

As our students gathered at the auditorium to view the "Harmony of the Worlds" segment of Cosmos, most had only a superficial knowledge of Johannes Kepler, his work, his times, and his vision, and virtually no understanding of how the field of astronomy developed. Furthermore, as they later told us, they weren't particularly interested!

For many students, the Cosmos film was enough to pique their curiosity. Sagan's commentary, the rich and realistic portrayal of the customs, problems and ambience of the period, and the effects of those early astronomical discoveries on our lives today all combined to intrigue and stir them.

> *"There were so many topics talked about in the film that everyone found something that interested them or that caught their attention thus causing a desire to learn more."*

After the film was over, we returned to our classroom and the teacher asked students to think of all the possible topics suggested by the film. Faculty circulated to provide encouragement, initial suggestions, and clarification of the task. After one or two minutes of silence they seemed to understand and ideas

rapidly accumulated. Much to our delight, we occasionally heard one student reminding another, "No judgements! We're brainstorming. We want all the ideas we can get!"

> *"I really liked the ideas of brainstorming and getting to choose the topic we were most interested in to study. I learn a lot more when I am studying something I'm interested in."*

When we reconvened as a large group, Ron, who was modeling the teacher, suggested three possible themes for the unit. Students were then asked to connect the ideas generated during the brainstorming with the unit themes. A lively session followed with Ron diagramming the connections. When we finished, the students had produced the following "web".

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After the "webbing" was completed, the students were provided with index cards to list three areas they would be interested in investigating. No discussion or sharing of lists was allowed in order to encourage people to think and choose areas of interest to them rather than making choices based on classroom "cliques". While the students were on break, the faculty sorted the cards and created interest groups. Three factors were considered: (1) student's first choices, (2) personalities, and (3) group sizes. In most cases, students were able to work in their area of highest interest. Groups ranged in size from two to five people. The subject areas were medieval music,

medieval architecture, astrology, witchcraft, life on other planets, early cultures that used astronomy, and constellations and myths.

The students were then given 45 minutes to accomplish the following small group tasks:

1. Discuss the topic chosen and determine the direction of investigation. Write a specific question around which research would be focused.

2. Decide how the work would be allocated among group members.

3. Specify what aspect of research would be pursued on the field trip.

4. Indicate how the research would be shared with the rest of the class. (Written reports were not acceptable.)

We spent the last fifteen minutes of the class listening to the groups report on their progress, helping them to narrow the focus of research, and making suggestions concerning the field trip and the final presentations.

Although our major purpose in modeling a thematic or integrated approach was to teach our students what integrated education is and how to accomplish it, we were also interested in providing

content that was intellectually challenging. Additionally, we were interested in having them identify and practice group process skills. The following student comments provide some indications of their growing appreciation for both the advantages and disadvantages of working in groups and the skills necessary for group work to be successful.

> *"I also liked the idea of working in groups. This way you can share and build on each other's ideas. You have a sense of teamwork making it more fun than work! Working in groups also gives more variety to the topic. We made use of many different learning approaches; roleplaying, research, story telling, discussion, reading, art, etc."*

> *"...at times it was hard to work with a partner. We each had different ideas and interests. Then again this is a good experience for us to learn to work well with others. Everyone should be able to work well with others, especially those of us who are in the teaching profession."*

> *"The main thing I learned from this experience is the importance of group process. In my group there was a person who didn't really want to be an active member. It was really hard to organize our presentation. I learned that it's very important for all the members to be working together instead of against each other."*

DAY II - 7:00 a.m. - 6:00 p.m.

The second day of the unit was devoted to a class field trip to a larger metropolitan area within driving distance. Activity centered around one whole group experience and several small group activities all of which were related to the various topics

being pursued. A part of the morning was spent at a planetarium learning more about the constellations, their beauty, myths related to the stars, and the practical uses of these myths. (Early astronomy.)

The remainder of the day was spent by students individually or in small groups working independently on their particular area of interest. The students had been encouraged to be creative in their research efforts; to move beyond sole reliance on books. They seemed quite excited about the prospect of learning through direct involvement. Some people worked in the public library, some visited museums, some roamed the streets looking for medieval architecture, some did street corner interviews, and one group even went hunting for a witch! Faculty members also sought information about topics in which they were interested.

DAY III - 8:00 a.m. - 12:00 p.m.

We started the third morning with a whole group activity related to our visit to the planetarium. We discussed constellations and myths, gave the students "star maps" and invited them to create their own constellations and write myths to explain them. It was a pleasant, as well as educational, way to begin the day. Many of the constellations and myths were interesting, creative, or funny. They definately reflected a human tendency to make sense of the world through one's own experiential framework!

For the rest of the morning, students continued their re-

search efforts. The previously collected resource books were available to the students as were faculty resource people.

DAY IV - 8:00 a.m. - 12:00 p.m.

On the last day the students spent an hour completing their preparations for the presentations. The rest of the morning was spent sharing what they had learned. We had encouraged them to find interesting and innovative ways to "teach" their peers newly acquired information. Most of them were quite successful.

The first group wanted to expose stereotypes associated with witches. In order to forcefully make the point, they dressed in stereotypical costumes complete with long, pointed noses and straggly hair! Everyone was instantly attentive and quickly learned the differences between the reality and stereotypes of witchcraft.

Another group dealt with the affect of religion on scientific investigation. The students marched into the darkened classroom wearing solemn black robes and carrying candles. Their simulation of a conclave of concerned and persecuted scientists discussing the hazards of their profession provided us both with facts about scientific discoveries and insight into some aspects of medieval life.

The group who interviewed people about the possibility of life on other planets shared their tapes with us. They described the excitement and problems of gaining information

through street-corner interviews.

A group helped us learn the differences between Renaissance and Medieval music. They played tapes of the different types of music and displayed pictures of early instruments. Their musical selections were beautiful and seemed to move many people. Later, there were comments about not having appreciated "that kind" of music before and questions about where to obtain similar tapes.

These are just a few of the many techniques the students added to their repertoire of teaching skills. Their reactions to the experience were unanimously positive. As their comments indicated, they felt this type of teaching and learning was fun, useful, and motivating. Not only did they learn new information, they discovered new possibilities for enhancing education.

> *"The group presentations were very informative and had a great deal of educational value. I liked the idea that there were no limitations put on us as to how we are to present what we have learned."*

> *"Just by listening to the presentations I could tell that thought and creativity was utilized...I could see that the interest was there...everyone gained a lot of new and interesting knowledge."*

At the end of the morning, we briefly talked with the students about their experiences. They were given a questionnaire and asked to give some serious thought to the questions. We wanted them to 1) consider and evaluate their contributions to

this particular learning experience, 2) suggest how the thematic approach could be used with children, and 3) evaluate what they had gained both as learners and as prospective teachers. Although we had occasionally mentioned the elementary classroom during their thematic experience, we focused mainly on them as learners. We were interested in finding out what parallels they would draw and the adaptations they thought would be necessary in using this approach with children. The students handed in these papers a week later and then met in small groups with faculty members to discuss the theory, application, and benefits of this approach and potential problems in implementing it.

> *"As a learner I felt this was a very beneficial experience. The learning was done in an active manner which was in itself a good learning experience. Actually participating and deciding your own goal and achieving that goal was an accomplishment. Learning was done in a cooperative yet independent manner. It gave the learner a chance to pursue areas that he found interesting rather than learning what the teacher wanted. I found that as a learner we all set our standards high and pursued areas that weren't as easy."*

> *"The thematic approach is a nice way of getting involved in one topic and doing some in-depth research instead of hopping around from subject to subject."*

> *"I enjoyed the experience. I touched upon all the content areas, and yet I was doing something I'm interested in. I was able to choose."*

> *"...I think kids would really get excited and involved in it. If you can get students interested in something, they will get something out of it."*

"I felt this was a really good teaching technique. It teaches children to use the library or develop research skills. Children discover learning is fun and it enhances their oral presentation skills."

"I learned a lot through this - many things which would be important for children to know. Example - researching, discussing, reading, writing - learned by being actively involved. Also I think it was helpful for me to go through this approach as a student before I try to use it as a teaching strategy."

From the student responses and from our own perspective, the experience was clearly a success. The following were major factors in successfully implementing our thematic unit.

1. Faculty enthusiasm and commitment.

   All of the faculty members became deeply involved in the topic and were personally interested in the Cosmos videotape and associated topics. Other faculty became engaged in dialogues about Kepler, Galileo, and the Copernican Revolution. This translated into hours of work and thought by each involved faculty member, and days of instruction by the primary instructor.

2. Real learning.

   One of the criteria for selecting the topic was that serious, adult level learning would be necessary for each student. The topic had to be suitable so that students could play their part in the process.

3. High expectations.

It would be easy for students to view this type of activity as unimportant since it doesn't fit into any of the five curricular areas included in the methods course. Thus, it was made clear from the beginning that their performance would be evaluated and included in the grade for each of the areas. The necessity to publicly produce an end product other than a simple report also conveyed performance expectations.

4. Choice of topic.

The topic clearly had far more aspects for possible investigation than could have been pursued in even a much longer period of time. Every student could find several topics that were of interest. The videotape (and Sagan's obvious enthusiasm for his subject) also provided motivation of a quality and immediacy that is sometimes difficult to generate.

5. An adventurous class.

We have found that classes such as this that meet together all morning develop distinct personalities. This class was definately willing to try anything once.

We have now, at the time of this writing, included a unit of integration with a second group of students and intend to make the unit a regular part of the methods block of courses. Student's comments and evaluations of the experience continue to be very positive.

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